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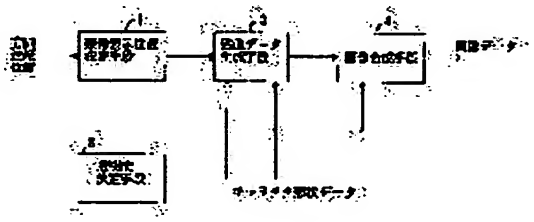
(54) GAME DEVICE

(57)Abstract:
PURPOSE: To effectively display an afterimage with less data capacity and simple processing concerning the game device for displaying the afterimage of a character to move.
CONSTITUTION: Data such as the moving direction, speed and position of the character are supplied to an afterimage display position deciding means 1 and corresponding to the moving direction and speed of the character, the display positions of the plural afterimages of the character are decided on the opposite side in the moving direction of the character. A transparency degree deciding means 2 decides the degrees of transparency for the respective after-images which display positions are decided. While using the shape data of the character, data showing the display positions of the respective afterimages and data showing the degrees of transparency for the respective afterimages, an afterimage data generating means 3 generates the image data of respective afterimages in the same shape as the character. While using the generated image data of respective afterimages, the image data of the character, the image data of a background picture on a screen and the image data of other objects on the screen, an image synthesizing means 4 synthesizes the image data of one picture so that the background pictures of respective afterimages can be made transparent corresponding to the degrees of transparency for respective afterimages.



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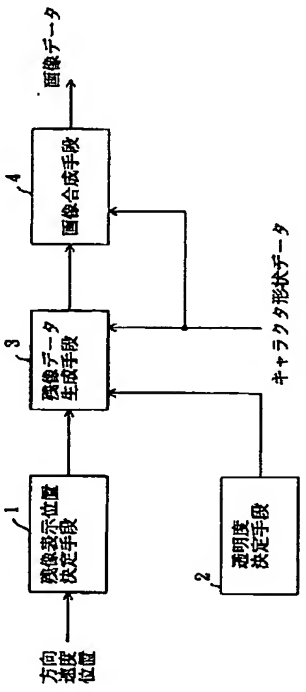
(54)【発明の名称】　ゲーム装置

(57)【要約】

【目的】　本発明は移動するキャラクタの残像を表示するゲーム装置に関し、少ないデータ容量で、簡単な処理で、効果的に残像表示できることを目的とする。

【構成】　残像表示位置決定手段１は、キャラクタの移動方向、速度、位置のデータを供給され、キャラクタの移動方向と速度に対応して、キャラクタの移動方向の反対側に、キャラクタの複数の残像の表示位置を決定する。透明度決定手段２は、表示位置が決定された各残像の透明度を決定する。残像データ生成手段３は、キャラクタの形状データ、各残像の表示位置のデータ、各残像の透明度のデータを用いて、キャラクタと同一形状の各残像の画像データを生成する。画像合成手段４は、生成された各残像の画像データ、キャラクタの画像データ、画面の背景画の画像データ、画面上の他の表示物の画像データを用いて、各残像の透明度に応じて各残像の背景画が透ける状態に１画面の画像データを合成する。



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【特許請求の範囲】

【請求項１】　プレイヤの操作やゲームの状況に応じて、表示装置の画面上を所定形状のキャラクタを移動させるようにゲームの進行を制御し、ゲームの進行に応じて生成した１画面の画像データに基づいて前記表示装置の画面上に画像を表示するゲーム装置において、

前記キャラクタの移動方向、速度及び位置のデータを供給されて、前記キャラクタの移動方向と速度に対応させて、前記キャラクタの移動方向の反対側にて、前記キャラクタの残像を複数表示する表示位置を決定する残像表示位置決定手段と、

前記残像表示位置決定手段により表示位置が決定された各残像の透明度を決定する透明度決定手段と、

前記キャラクタの形状データ、前記各残像の表示位置のデータ、前記各残像の透明度のデータを用いて、前記キャラクタと同一形状である各残像の画像データを生成する残像データ生成手段と、

前記生成された各残像の画像データ、前記キャラクタの画像データ、画面の背景画の画像データ及び画面上の他の表示物の画像データを用いて、前記各残像の透明度に応じて各残像の背景画が透ける状態に、１画面の画像データを合成する画像合成手段とを有することを特徴とするゲーム装置。

【請求項２】　前記残像表示位置決定手段は、前記キャラクタの速度に応じて表示する残像数を変えることを特徴とする請求項１記載のゲーム装置。

【請求項３】　前記残像表示位置決定手段は、前記キャラクタの速度に応じて表示する各残像の間隔を変えることを特徴とする請求項１記載のゲーム装置。

【請求項４】　前記透明度決定手段は、前記各残像の透明度をキャラクタの位置からの距離に応じて変えることを特徴とする請求項１記載のゲーム装置。

【請求項５】　前記キャラクタの形状は、ポリゴンモデルにより、視点の変化に応じて３次元形状が決定されることを特徴とする請求項１記載のゲーム装置。

【請求項６】　前記キャラクタの形状は、前記キャラクタの移動中に、縮小又は拡大され、前記残像データ生成手段は、前記キャラクタが残像表示位置を通過したときの大きさの残像の画像データを生成することを特徴とする請求項１記載のゲーム装置。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明はゲーム装置に係り、特に、ゲーム画面上を移動するキャラクタの残像を表示するゲーム装置に関する。

【０００２】

【従来の技術】ゲーム装置、例えば、モニタテレビ，音声出力装置、入力パッド（入力装置）等を備えたテレビゲーム装置では、プレイヤは、モニタテレビの画面を見ながら入力パッドの各ボタン等を操作してゲームを行う。

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【０００３】テレビゲーム装置でプレイするゲームには、プレイヤの操作やゲームの状況に応じて、画面上を所定形状のキャラクタが移動しながら、ゲームが行われるものがある。

【０００４】移動するキャラクタにスピード感を持たせるため、従来、移動中のキャラクタの後方にキャラクタの残像を表示することが行われている。

【０００５】従来の、スピード感を持たせるための残像表示の一つの方法として、移動方向と移動速度に対応した残像のパターンを、必要な種類だけ、予め記憶しておき、キャラクタの移動方向と移動速度に対応した残像パターンを選択して、キャラクタの後方に表示する方法がある。

【０００６】また、別の方法としては、一般的なモーションブラー表現を用いる方法として、動きを表現するためにキャラクタの形状を移動中に変化させ、キャラクタが移動中に通過した移動軌跡上で、通過時点でのキャラクタの形状を残像として表示する方法がある。

【０００７】また、別の方法としては、キャラクタの後方に、キャラクタのパターンを点滅させて表示して、残像とする方法がある。

【０００８】

【発明が解決しようとする課題】従来の、キャラクタの移動方向と移動速度に対応した残像パターンを選択して、キャラクタの後方に表示する方法では、キャラクタの移動方向と移動速度に応じた種類の残像パターンを記憶しておく必要がある。このため、キャラクタの移動の種類が多い場合、これに全て対応した残像パターンを持とうとすると、残像パターンのデータ量が大きくなり、必要なメモリ容量が大きくなるという問題がある。逆に、残像パターンの種類を制限すると、キャラクタの動きの方向と速度の種類も制限されてしまう。

【０００９】また、一般的なモーションブラー表現を用いる方法では、キャラクタの通過軌跡上に表示される残像は、残像の表示位置を通過したときの形状であるため、キャラクタの形状変化が目につき、スピード感の強調性が弱いという問題がある。また、キャラクタの後方に表示する残像の数を少なくすると、隣接する残像間の形状変化が大きくなり、動きがうまく表現されないという問題がある。また、キャラクタの移動中の形状変化等を複雑な処理で算出する必要があるため、ゲーム装置に高い処理能力が要求されるという問題がある。

【００１０】また、キャラクタの後方に、キャラクタのパターンを点滅させて表示して、残像とする方法では、ちらつきが目立って残像としての表現がうまくできないという問題がある。

【００１１】特に透明度の制御をキャラクタパターンの点滅で行う方法においては、その透明度合いは、専らその点滅の時間的な間隔の長短よるところが大きく、その

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時間的な間隔を広げすぎると残像としての効果を奏することができず、また、最も狭い点滅間隔は垂直同期信号毎の点滅に限られ、それ以上細かい点滅はできない。従って、多様な透明感を表現することは非常に困難である。

【００１２】本発明は、上記の点に鑑みてなされたもので、少ないデータ容量で、複雑な処理を必要とすることなく、効果的な残像表現のできるゲーム装置を提供することを目的とする。

【００１３】

【課題を解決するための手段】図１は本発明の原理構成図を示す。図１に示すように、請求項１の発明では、プレイヤの操作やゲームの状況に応じて、表示装置の画面上を所定形状のキャラクタを移動させるようにゲームの進行を制御し、ゲームの進行に応じて生成した１画面の画像データに基づいて前記表示装置の画面上に画像を表示するゲーム装置において、残像表示位置決定手段１は、前記キャラクタの移動方向、速度及び位置のデータを供給されて、前記キャラクタの移動方向と速度に対応させて、前記キャラクタの移動方向の反対側にて、前記キャラクタの残像を複数表示する表示位置を決定する。

【００１４】透明度決定手段２は、前記残像表示位置決定手段により表示位置が決定された各残像の透明度を決定する。

【００１５】残像データ生成手段３は、前記キャラクタの形状データ、前記各残像の表示位置のデータ、前記各残像の透明度のデータを用いて、前記キャラクタと同一形状である各残像の画像データを生成する。

【００１６】画像合成手段４は、前記生成された各残像の画像データ、前記キャラクタの画像データ、画面の背景画の画像データ及び画面上の他の表示物の画像データを用いて、前記各残像の透明度に応じて各残像の背景画が透ける状態に、１画面の画像データを合成する。

【００１７】請求項２の発明では、前記残像表示位置決定手段１は、前記キャラクタの速度に応じて表示する残像数を変える。

【００１８】請求項３の発明では、前記残像表示位置決定手段１は、前記キャラクタの速度に応じて表示する各残像の間隔を変える。

【００１９】請求項４の発明では、前記透明度決定手段２は、前記各残像の透明度を前記キャラクタの位置からの距離に応じて変える。

【００２０】請求項５の発明では、前記キャラクタの形状は、ポリゴンモデルにより、視点の変化に応じて３次元形状が決定される。

【００２１】請求項６の発明では、前記キャラクタの形状は、前記キャラクタの移動中に、縮小又は拡大され、前記残像データ生成手段３は、前記キャラクタが残像表示位置を通過したときの大きさの残像の画像データを生成する。

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【００２２】

【作用】請求項１の発明では、キャラクタの移動方向と速度に対応して、残像の表示位置を決定し、決定した表示位置に、キャラクタと同一形状の残像を複数表示する。このため、キャラクタの移動方向と速度に応じて異なる種類の残像パターンを持つ必要がなく、必要なデータ容量を削減することを可能とし、また、データ容量を増やすことなく、キャラクタのあらゆる移動方向，速度に対応した残像を表示することを可能とする。また、複雑な処理を行うことなく残像を表示することを可能とする。

【００２３】また、速度に応じて、残像の表示位置を変え、かつ、各残像を半透明で表示できるため、従来装置よりも効果的にキャラクタの速度感を表現することを可能とする。

【００２４】請求項２の発明では、キャラクタの速度に応じて表示する残像数を変えるため、キャラクタの速度感を強調して表現することを可能とする。

【００２５】請求項３の発明では、キャラクタの速度に応じて表示する各残像の間隔を変えるため、キャラクタの速度感を強調して表現することを可能とする。

【００２６】請求項４の発明では、各残像の透明度をキャラクタの位置からの距離に応じて変えるため、キャラクタの速度感をより効果的に表現することを可能とする。

【００２７】請求項５の発明では、キャラクタをポリゴンモデルで表示する場合に、キャラクタが視点の変化に応じて３次元形状が変化するのに対応して、残像も同様に３次元形状を変化させることを可能とする。

【００２８】請求項６の発明では、キャラクタの移動中に、キャラクタが縮小又は拡大される場合に、残像を半透明で表示できるため、キャラクタの縮小又は拡大によるキャラクタ内の絵の乱れを目立たなくすることを可能とする。

【００２９】

【実施例】図２は本発明の一実施例のゲーム装置１１の構成図を示す。ゲーム装置１１は、ゲーム装置本体１２、入力パッド２５、モニタテレビ２２、オーディオアンプ２３、スピーカ２４から構成される。

【００３０】ゲーム装置本体１２は、全体の制御を行うＣＰＵ（中央処理装置）１３、システムプログラムや固定のデータ等が格納されたＲＯＭ１４、各種データの一時格納や、各種作業を行うためのＲＡＭ１５、タイマ１６、ＣＤ－ＲＯＭ装置１７、ＣＰＵ１３に制御されてモニタテレビ（表示装置）２２にビデオ信号を供給するビデオジェネレータ１８、オーディオ信号を生成するサウンドジェネレータ１９を備えている。

【００３１】サウンドジェネレータ１９で生成されたオーディオ信号はオーディオアンプ２３で増幅されて、スピーカ２４から音声が出力される。

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【００３２】ゲーム操作用の入力装置としての入力パッド２５は、スタートボタン、方向ボタン、攻撃ボタン等の入力ボタンを備えている。

【００３３】ＣＤ－ＲＯＭ２６に記録されているゲームプログラムのデータは、ＣＤ－ＲＯＭ装置１７で再生されて、ＣＰＵ１３により読み込まれて、ＲＡＭ１５に格納される。

【００３４】ＣＰＵ１３は、ＲＡＭ１５に格納されたゲームプログラムに従い、プレイヤーが行う入力パッド２５の操作に応じてゲームの進行を制御する。ＣＰＵ１３は、このゲームの進行に合わせてビデオジェネレータ１８に画像データを供給して、モニタテレビ２２の画面にゲーム画像を表示させ、また、ゲームの進行に合わせてサウンドジェネレータ１９にオーディオ信号を生成させて、スピーカ２４からゲームの効果音を出力させる。

【００３５】次に、ゲーム装置１１における、キャラクタの残像の表示について説明する。ここでは、ゲーム装置１１が、ゲームプログラムに従って、プレイヤの操作やゲームの状況に応じて、モニタテレビ２２の画面上を所定形状のキャラクタを移動させながら、ゲームの進行を制御する場合について考える。

【００３６】図３は、ＣＰＵ１３により実行される、キャラクタの残像を含む画像データを生成する手順を示すフローチャートである。また、図４，図５は、キャラクタと残像の表示例を示す。

【００３７】プレイヤーがゲームプログラムのＣＤ－ＲＯＭ２６をＣＤ－ＲＯＭ装置１７にセットして、ゲーム装置１１の電源をオンにすると、ＣＰＵ１３は、ゲームプログラムをＣＤ－ＲＯＭ装置１７から読み込み、ＲＡＭ１５に格納する。この後、ＣＰＵ１３は、ゲームプログラムの処理を開始する。

【００３８】ゲーム中、ＣＰＵ１３は、プレイヤの操作やゲームの状況に応じて、プレイヤが操作するキャラクタの位置，形状等のデータの更新、背景画のデータの更新、他のキャラクタのデータの更新、効果音の生成等の各種処理を行う。このゲーム中の各種処理と共に、所定時間ごと（例えば、１フレームごと）に、図３の画像データの生成処理を行う。

【００３９】図３において、ステップ１０４及びステップ１０５が残像表示位置決定手段に相当し、ステップ１０６が透明度決定手段に相当し、ステップ１０７が残像データ生成手段に相当し、ステップ１０８が画像合成手段に相当する。

【００４０】図３のステップ１０１では、ＣＰＵ１３は、キャラクタの移動方向を検出する。キャラクタの移動方向は、プレイヤの入力パッド２５の操作方向、及びゲームプログラムによるキャラクタの位置の制御により決まる。

【００４１】ステップ１０２では、キャラクタの画面上の現在位置を検出して、現在位置のデータと、現在から

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所定時間前までの位置のデータを保持する。例えば、現在から、１／６０秒ごとに、数秒前までの位置のデータを保持する。なお、時間の管理は、タイマ１６の時間データを用いて行うことができる。

【００４２】ステップ１０３では、ステップ１０２で保持しているキャラクタの位置のデータを用いて、キャラクタの移動速度を算出する。例えば、キャラクタの現在位置と所定時間前（例えば、１／６０秒前）の位置のデータを用いて、移動距離と移動に要した時間から、移動速度を算出する。

【００４３】ステップ１０４では、ステップ１０３で算出されたキャラクタの速度に対応して、キャラクタの後方（移動方向と反対側）に表示する残像数と残像の表示間隔を決定する。例えば、キャラクタの速度が速い程、表示する残像数を多くし、また、キャラクタから離れる程、隣接する残像の間隔を広くすることにより、キャラクタのスピード感を強調して表現することができる。本実施例では、残像の形状は、キャラクタの形状と同一形状としている。

【００４４】図４，図５は、キャラクタがランナーの場合の例で、図４は、キャラクタのＡ方向への速度が遅い場合のキャラクタと残像の表示例を示しており、図５は、キャラクタのＡ方向への速度が速い場合のキャラクタと残像の表示例を示している。図４では、キャラクタの現在位置のパターンP_{S0}と５個の残像のパターンR_{S1}～R_{S5}が表示されている。また、図５では、キャラクタの現在位置のパターンP_{F0}と、図４よりも速度が速いことにより、１０個の残像のパターンR_{F1}～R_{F10}が表示されている。

【００４５】なお、ステップ１０４では、表示する残像数と、残像の表示間隔のみを決めており、キャラクタの形状、残像の形状については特定していない。

【００４６】また、表示する残像数を一定として、速度が速くなる程、残像の表示間隔を広くする方法でも、スピード感を表現することができる。

【００４７】ステップ１０５では、前記検出された移動方向のデータと現在位置のデータ、ステップ１０４で決めた残像数と表示間隔のデータとを用いて、画面上での各残像の表示位置を算出する。

【００４８】ステップ１０６では、表示すべき各残像の透明度を決定する。例えば、キャラクタの現在位置から離れる程、透明度を高くして、背景画がより透けて見えるように決める。これにより、キャラクタのスピード感をより強調して表現することができる。

【００４９】図４の例では、キャラクタの現在位置のパターンP_{S0}は不透明で、５個の残像のパターンR_{S1}～R_{S5}は、キャラクタの現在位置から離れる程、透明度が高く設定されており、背景画がより透けて見える。図５の例も、図４と同様である。

【００５０】ステップ１０７では、キャラクタの形状デ

ータ、ステップ１０５で決定した各残像の表示位置のデータ、ステップ１０６で決定した各残像の透明度のデータを用いて、画面上における各残像の画像データを生成する。図４，図５の例に示すように、残像の形状は、現在位置のキャラクタの形状と同一形状としている。一つの残像の画像データは、残像パターン中の各ドットに関する、Ｒ，Ｇ，Ｂの３色のデータで構成される。

【００５１】ステップ１０８では、現在位置のキャラクタの画像データ、ステップ１０７で生成された各残像の画像データ、画面の背景画の画像データ及び画面上の他のキャラクタの画像データを用いて、前記各残像の透明度に応じて各残像の背景画が透ける状態に、１画面の画像データを合成する。

【００５２】ステップ１０９では、ステップ１０８で合成した１画面の画像データを、ビデオジェネレータ１８に供給して、モニタテレビ２２の画面上に合成結果の画像を表示させる。

【００５３】図4.は、合成された１画面の画像データに基づいて表示された例としての画像４１を示している。図４では、現在位置のキャラクタのパターンP_{S0}は不透明で、背景画４２は見えず、残像のパターンR_{S1}～R_{S5}では、キャラクタの現在位置から離れる程、透明度が高くなって、背景画４２がより透けて見える。なお、残像パターン同士の重なり部分は、後方の残像のパターンが隠れるように画像データを合成している。図５の例も図４と同様であるが、キャラクタの速度が速い分、残像のパターンR_{F1}～R_{F10}が多く表示されている。

【００５４】なお、ビデオジェネレータ１８に透明表現機能を持たせておき、ＣＰＵ１３から、ビデオジェネレータ１８への透明度の指定に応じて、ビデオジェネレータ１８にて、透明性を持つ残像と他の画像とを合成する構成とすることもできる。

【００５５】前記のように、本実施例によれば、キャラクタの移動方向と速度に対応して、残像の表示位置を決定し、決定した表示位置に、キャラクタと同一形状の残像を複数表示する。このため、キャラクタの移動方向と速度に応じて異なる種類の残像パターンを持つ必要がなく、必要なデータ容量を削減することができる。また、データ容量を増やすことなく、キャラクタのあらゆる移動方向，速度に対応した残像を表示することができる。

【００５６】また、一般のモーションブラー表現の方法のような複雑な処理を必要とせず、残像表現に伴うＣＰＵ１３の負担を小さくすることができる。

【００５７】また、速度に応じて、表示する残像数と残像の表示間隔を変えるため、キャラクタのスピード感を強調して表現することができる。また、各残像の透明度をキャラクタの位置からの距離に応じて変えるため、キャラクタのスピードをより効果的に表現することができる。

【００５８】なお、キャラクタをポリゴンモデルで表示

する場合には、キャラクタの３次元形状が視点の変化に応じて変化するが、本実施例では、残像を現在位置のキャラクタと同一形状としているため、キャラクタと同様に残像の３次元形状を変化させることが容易に実現できる。

【００５９】図６は、ズームアニメーションの際に、半透明表示による残像表示を適用した場合の説明図を示す。図６の例は、球形のキャラクタが、Ｃ方向への移動に伴い、ズームで縮小される場合であり、移動終了後のキャラクタパターンP_{Z0}の後方の移動軌跡上に、残像パターンR_{Z1}～R_{Z4}を半透明で表示する。なお、残像パターンR_{Z4}は、キャラクタの移動開始時の位置にある。

【００６０】残像の表示手順としては、例えば、キャラクタの移動開始時に、移動方向、移動速度、移動終了点までの移動距離のデータを取得しておき、これらのデータを基に、移動軌跡上の残像の表示位置、残像数、各残像の透明度を決定しておく。

【００６１】キャラクタの移動が開始された後は、キャラクタの移動に伴い、残像を１個ずつ表示させる。このため、表示すべき各残像ごとに、キャラクタが残像表示ポイントを通過したときのキャラクタの形状を保持し、この保持したキャラクタのパターンデータを用いて予め決めた透明度の残像データを生成し、この後、背景画と合成した画像データを生成して、画面に表示させる。

【００６２】このように、キャラクタの移動中に、キャラクタが縮小又は拡大される場合に、残像を半透明で表示できるため、キャラクタの縮小又は拡大によるキャラクタ内の絵の乱れを目立たなくすることができる。特にキャラクタの縮小時に、ドットを間引くことによる色飛び等の絵の乱れを目立たなくすることができる。

【００６３】なお、ＣＤ－ＲＯＭ２６の代わりに、ゲーム装置本体１２に装着されるカートリッジから、ゲームプログラムをＲＡＭ１５に読み込んで、プログラムを実行する構成とすることもできる。

【００６４】

【発明の効果】上述の如く、請求項１の発明によれば、キャラクタの移動方向と速度に対応して、残像の表示位置を決定し、決定した表示位置に、キャラクタと同一形状の残像を複数表示するため、キャラクタの移動方向と速度に応じて異なる種類の残像パターンを持つ必要がなく、必要なデータ容量を削減することができ、また、データ容量を増やすことなく、キャラクタのあらゆる移動方向，速度に対応した残像を表示することができ、また、複雑な処理を行うことなく残像を表示することができる。

【００６５】また、速度に応じて、残像の表示位置を変え、かつ、各残像を半透明で表示できるため、従来装置よりも効果的にキャラクタの速度感を表現することができる。

【００６６】請求項２の発明によれば、キャラクタの速

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度に応じて表示する残像数を変えるため、キャラクタの速度感を強調して表現することができる。

【００６７】請求項３の発明によれば、キャラクタの速度に応じて表示する各残像の間隔を変えるため、キャラクタの速度感を強調して表現することができる。

【００６８】請求項４の発明によれば、各残像の透明度をキャラクタの位置からの距離に応じて変えるため、キャラクタの速度感をより効果的に表現することができる。

【００６９】請求項５の発明によれば、キャラクタをポリゴンモデルで表示する場合に、キャラクタが視点の変化に応じて３次元形状が変化するのに対応して、残像も同様に３次元形状を変化させることができる。

【００７０】請求項６の発明によれば、キャラクタの移動中に、キャラクタが縮小又は拡大される場合に、残像を半透明で表示できるため、キャラクタの縮小又は拡大によるキャラクタ内の絵の乱れを目立たなくすることができる。

【図面の簡単な説明】

【図１】本発明の原理構成図である。

【図２】本発明の一実施例のゲーム装置の構成図である。

【図３】キャラクタの残像を含む画像データを生成する手順を示すフローチャートである。

【図４】速度が遅く場合の、キャラクタと残像の表示例

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を示す図である。

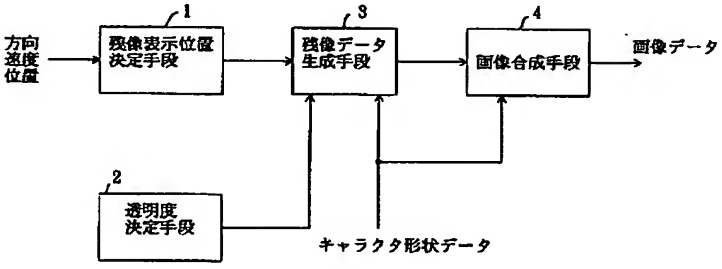
【図５】速度が速い場合の、キャラクタと残像の表示例を示す図である。

【図６】ズームアニメーションの際に、半透明表示による残像表示を適用した場合の説明図である。

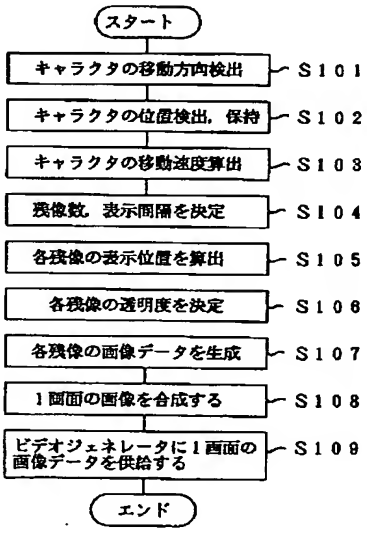
【符号の説明】

１　残像表示位置決定手段
２　透明度決定手段
３　残像データ生成手段
４　画像合成手段
１１　ゲーム装置
１２　ゲーム装置本体
１３　ＣＰＵ
１４　ＲＯＭ
１５　ＲＡＭ
１６　タイマ
１７　ＣＤ－ＲＯＭ装置
１８　ビデオジェネレータ
１９　サウンドジェネレータ
２２　モニタテレビ
２３　オーディオアンプ
２４　スピーカ
２５　入力パッド
２６　ＣＤ－ＲＯＭ

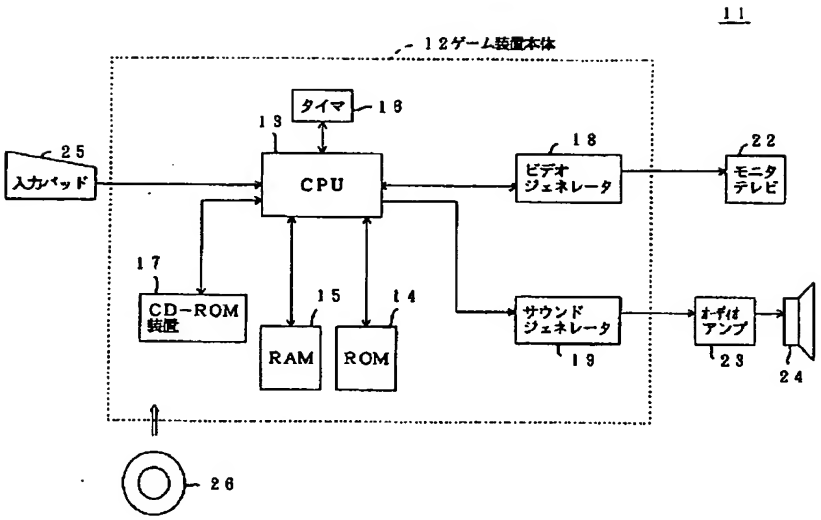
【図１】



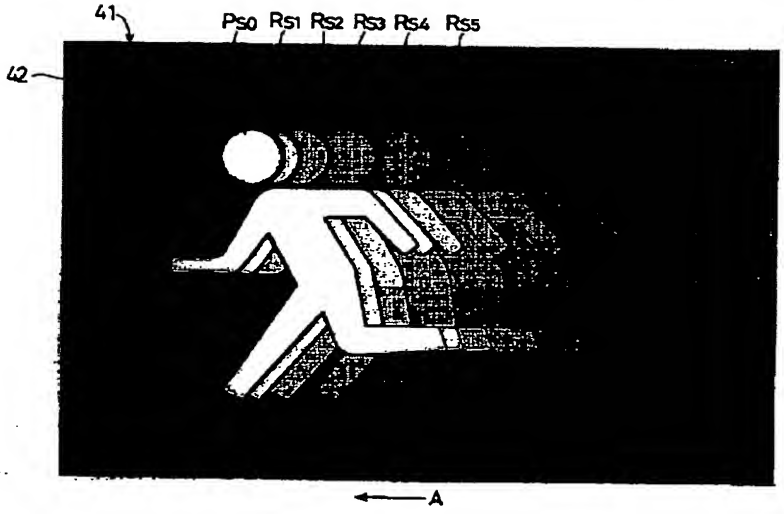
【図３】



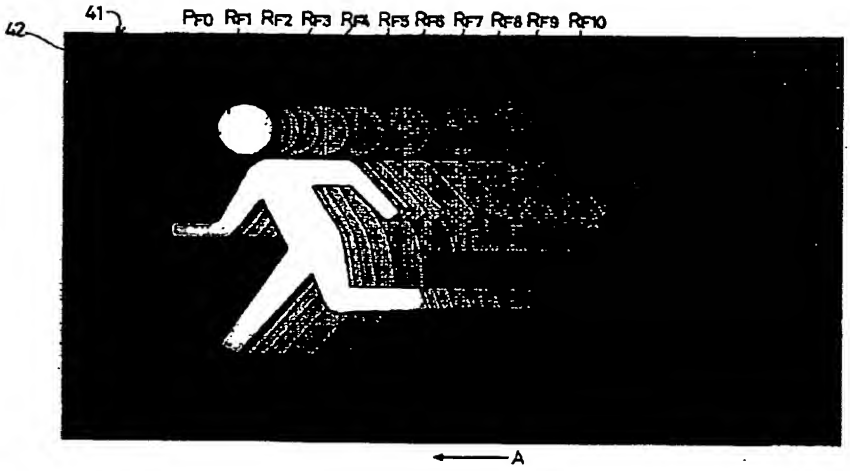
【図２】



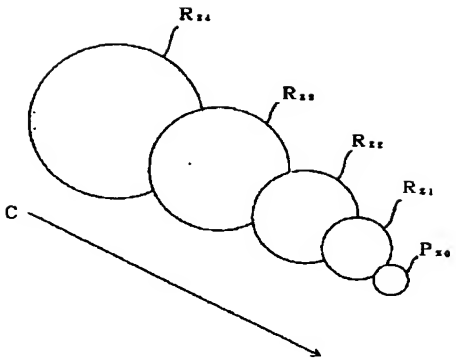
【図４】



【図５】


41
42
PF0 RF1 RF2 RF3 RF4 RF5 RF6 RF7 RF8 RF9 RF10
A

【図６】


Rz4
Rz3
Rz2
Rz1
Pz0
C

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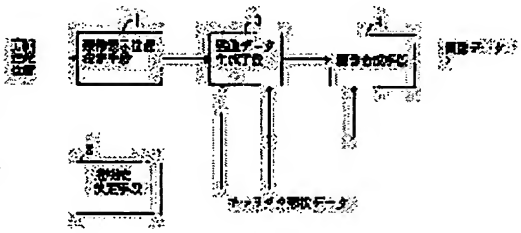
(72)Inventor : KITAMURA MISAYOSHI
OKAMOTO HIROSHI

(54) GAME DEVICE

(57)Abstract:

PURPOSE: To effectively display an afterimage with less data capacity and simple processing concerning the game device for displaying the afterimage of a character to move.

CONSTITUTION: Data such as the moving direction, speed and position of the character are supplied to an afterimage display position deciding means 1 and corresponding to the moving direction and speed of the character, the display positions of the plural afterimages of the character are decided on the opposite side in the moving direction of the character. A transparency degree deciding means 2 decides the degrees of transparency for the respective after-images which display positions are decided. While using the shape data of the character, data showing the display positions of the respective afterimages and data showing the degrees of transparency for the respective afterimages, an afterimage data generating means 3 generates the image data of respective afterimages in the same shape as the character. While using the generated image data of respective afterimages, the image data of the character, the image data of a background picture on a screen and the image data of other objects on the screen, an image synthesizing means 4 synthesizes the image data of one picture so that the background pictures of respective afterimages can be made transparent corresponding to the degrees of transparency for respective afterimages.



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* NOTICES *

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3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] Game equipment which displays an image on a screen of said display based on image data of one screen which controlled progress of a game according to actuation of a player and a condition of a game which are characterized by providing the following to move a character of a predetermined configuration for a screen top of a display, and was generated according to progress of a game An after-image display-position decision means to determine a display position which data of the migration direction of said character, speed, and a location is supplied, is made to correspond to the migration direction and speed of said character, and displays two or more after-images of said character in an opposite hand of the migration direction of said character A transparency decision means to determine transparency of each after-image as which a display position was determined by said after-image display-position decision means An after-image data generation means to generate image data of each after-image which is the same configuration as said character using configuration data of said character, data of a display position of each of said after-image, and data of transparency of each of said after-image An image composition means to compound image data of one screen using image data of each of said generated after-image, image data of said character, image data of background drawing of a screen, and image data of other display objects on a screen in the condition that background drawing of each after-image is transparent according to transparency of each of said after-image
[Claim 2] Said after-image display-position decision means is game equipment according to claim 1 characterized by changing the number of after-images displayed according to speed of said character.
[Claim 3] Said after-image display-position decision means is game equipment according to claim 1 characterized by changing a gap of each after-image displayed according to speed of said character.
[Claim 4] Said transparency decision means is game equipment according to claim 1 characterized by changing transparency of each of said after-image according to distance from a location of a character.
[Claim 5] A configuration of said character is game equipment according to claim 1 characterized by determining a three-dimension configuration with a polygon model according to change of a view.
[Claim 6] It is game equipment according to claim 1 which a configuration of said character is reduced or expanded during migration of said character, and is characterized by said after-image data generation means generating image data of an after-image of magnitude when said character passes through an after-image display position.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to game equipment and relates to the game equipment which displays the after-image of the character which moves especially in a game screen top.
[0002]
[Description of the Prior Art] With TV-game equipment equipped with game equipment, for example, a monitor TV, the audio output device, the input pad (input unit), etc., looking at the screen of a monitor TV, a player operates each carbon button of an input pad etc., and performs a game.
[0003] While the character of a predetermined configuration moves in a screen top according to actuation of a player, or the condition of a game, there are some to which a game is performed in the game played with TV-game equipment.
[0004] In order to give speediness to the character which moves, displaying the after-image of a character behind the character under migration conventionally is performed.
[0005] Only the required class memorizes beforehand the pattern of the migration direction and the after-image corresponding to passing speed as the one method of the after-image display for giving the conventional speediness, the after-image pattern corresponding to the migration direction and passing speed of a character is chosen, and there is the method of displaying behind a character.
[0006] Moreover, as an option, as a method using a general motion blur expression, in order to express a motion, while moving the configuration of a character, it is made to change, and there is the method of displaying the configuration of the character in a passage event as an after-image on the migration locus which passed while the character moved.
[0007] Moreover, as an option, the pattern of a character is blinked behind a character, it displays, and there is the method of making it into an after-image.
[0008]
[Problem(s) to be Solved by the Invention] It is necessary to choose the after-image pattern corresponding to the conventional migration direction and the passing speed of a character, and to memorize the after-image pattern of a class according to the migration direction and passing speed of a character by the method of displaying behind a character. For this reason, when there are many classes of migration of a character and it is going to have an after-image pattern altogether corresponding to this, there is a problem that the amount of data of an after-image pattern becomes large, and required memory space becomes large. On the contrary, a limit of the class of after-image pattern will also restrict the direction of a motion of a character, and the class of speed.
[0009] Moreover, by the method using a general motion blur expression, since the after-image displayed on the passage locus of a character is a configuration when passing through the display position of an after-image, configuration change of a character takes lessons for it from an eye, and the problem that the emphasis nature of speediness is weak is. Moreover, when the number of the after-images displayed behind a character is lessened, the configuration change between the adjoining after-images becomes large, and there is a problem that a motion is not expressed well. Moreover, since it is necessary to compute the configuration change under migration of a character etc. by complicated processing, there is a problem that a high throughput is required of game equipment.
[0010] Moreover, the pattern of a character is blinked behind a character, it displays, and there is a problem that a flicker is conspicuous and the expression as an after-image cannot be performed well, by the method of making it into an after-image.
[0011] In the method of controlling especially transparency by the flash of a character pattern, the transparence degree cannot do the effect as an after-image so, if merits-and-demerits **** of the time gap of the flash and time are large and extend the time gap too much chiefly, and the narrowest flash gap is restricted to the flash for every Vertical

Synchronizing signal, and a fine flash cannot be performed any more. Therefore, it is dramatically difficult to express the various feeling of transparence.
[0012] This invention was made in view of the above-mentioned point, it is small data volume, and it aims at offering the game equipment which can perform an effective after-image expression, without needing complicated processing.
[0013]
[Means for Solving the Problem] Drawing 1 shows a principle block diagram of this invention. As shown in drawing 1 , actuation of a player and a condition of a game are embraced in invention of claim 1. In game equipment which displays an image on a screen of said display based on image data of one screen which controlled progress of a game to move a character of a predetermined configuration for a screen top of a display, and was generated according to progress of a game Data of the migration direction of said character, speed, and a location is supplied to the after-image display-position decision means 1, it is made to correspond to the migration direction and speed of said character, and a display position which displays two or more after-images of said character in an opposite hand of the migration direction of said character is determined.
[0014] The transparency decision means 2 determines transparency of each after-image as which a display position was determined by said after-image display-position decision means.
[0015] The after-image data generation means 3 generates image data of each after-image which is the same configuration as said character using configuration data of said character, data of a display position of each of said after-image, and data of transparency of each of said after-image.
[0016] The image composition means 4 compounds image data of one screen using image data of each of said generated after-image, image data of said character, image data of background drawing of a screen, and image data of other display objects on a screen in the condition that background drawing of each after-image is transparent according to transparency of each of said after-image.
[0017] In invention of claim 2, said after-image display-position decision means 1 changes the number of after-images displayed according to speed of said character.
[0018] In invention of claim 3, said after-image display-position decision means 1 changes a gap of each after-image displayed according to speed of said character.
[0019] In invention of claim 4, said transparency decision means 2 changes transparency of each of said after-image according to distance from a location of said character.
[0020] In invention of claim 5, as for a configuration of said character, a three-dimension configuration is determined by polygon model according to change of a view.
[0021] In invention of claim 6, a configuration of said character is reduced or expanded during migration of said character, and said after-image data generation means 3 generates image data of an after-image of magnitude when said character passes through an after-image display position.
[0022]
[Function] In invention of claim 1, two or more after-images of the same configuration as a character are displayed on the display position which determined and determined the display position of an after-image corresponding to the migration direction and speed of a character. For this reason, it makes it possible to display all the migration directions of a character, and the after-image corresponding to speed, without not having the after-image pattern of a different class according to the migration direction and speed of a character, and making it possible to reduce required data volume, and increasing data volume. Moreover, it makes it possible to display an after-image, without performing complicated processing.
[0023] Moreover, the display position of an after-image is changed according to speed, and since it is translucent and each after-image can be displayed, it makes it possible to express the sensation of speed of a character more effectively than conventional equipment.
[0024] In invention of claim 2, in order to change the number of after-images displayed according to the speed of a character, it makes it possible to emphasize and express the sensation of speed of a character.
[0025] In invention of claim 3, in order to change the gap of each after-image displayed according to the speed of a character, it makes it possible to emphasize and express the sensation of speed of a character.
[0026] In invention of claim 4, in order to change the transparency of each after-image according to the distance from the location of a character, it makes it possible to express the sensation of speed of a character more effectively.
[0027] In invention of claim 5, when displaying a character with a polygon model, a character makes it possible for an after-image to also change a three-dimension configuration similarly corresponding to a three-dimension configuration changing according to change of a view.
[0028] In invention of claim 6, since it is translucent and an after-image can be displayed during migration of a

character when a character is reduced or expanded, it makes it possible not to be conspicuous and to carry out turbulence of the picture in the character by a cutback or amplification of a character.
[0029]
[Example] Drawing 2 shows the block diagram of the game equipment 11 of one example of this invention. Game equipment 11 consists of the main part 12 of game equipment, the input pad 25, a monitor TV 22, an audio amplifier 23, and a loudspeaker 24.
[0030] The main part 12 of game equipment is equipped with the temporary storage of the ROM14 and the various data with which CPU (central processing unit)13 and the system program which control the whole, the data of immobilization, etc. were stored, RAM15 for doing various activities, a timer 16, CD-ROM equipment 17, the video generator 18 that is controlled by CPU13 and supplies a video signal to a monitor TV (indicating equipment) 22, and the sound generator 19 which generates an audio signal.
[0031] The audio signal generated with the sound generator 19 is amplified with an audio amplifier 23, and voice is outputted from a loudspeaker 24.
[0032] The input pad 25 as an input unit for game actuation is equipped with input carbon buttons, such as a start button, a direction carbon button, and an attack carbon button.
[0033] It is reproduced with CD-ROM equipment 17, and the data of the game program currently recorded on CD-ROM26 is read by CPU13, and is stored in RAM15.
[0034] CPU13 controls progress of a game according to the actuation of the input pad 25 which a player performs according to the game program stored in RAM15. CPU13 supplies image data to a video generator 18 according to progress of this game, and displays a game image on the screen of a monitor TV 22, and makes a sound generator 19 generate an audio signal according to progress of a game, and makes the sound effect of a game output from a loudspeaker 24.
[0035] Next, the display of the after-image of a character in game equipment 11 is explained. Here, game equipment 11 considers the case where progress of a game is controlled, moving the character of a predetermined configuration for the screen top of a monitor TV 22 according to actuation of a player, or the condition of a game according to a game program.
[0036] Drawing 3 is a flow chart which is performed by CPU13 and which shows the procedure which generates image data including the after-image of a character. Moreover, drawing 4 and drawing 5 show the example of a display of a character and an after-image.
[0037] If a player sets CD-ROM26 of a game program in CD-ROM equipment 17 and turns ON the power supply of game equipment 11, CPU13 reads a game program from CD-ROM equipment 17, and stores it in RAM15. Then, CPU13 starts processing of a game program.
[0038] CPU13 performs among a game various processings, such as renewal of data, such as a location of the character which a player operates, and a configuration, renewal of the data of background drawing, renewal of the data of other characters, and generation of a sound effect, according to actuation of a player, or the condition of a game. With the various processings in this game, generation processing of the image data of drawing 3 is performed for every (every [for example,] frame) predetermined time.
[0039] In drawing 3 , step 104 and step 105 are equivalent to an after-image display-position decision means, step 106 is equivalent to a transparency decision means, step 107 is equivalent to an after-image data generation means, and step 108 is equivalent to an image composition means.
[0040] At step 101 of drawing 3 , CPU13 detects the migration direction of a character. The migration direction of a character is decided by control of the location of the character by the actuation direction and game program of the input pad 25 of a player.
[0041] At step 102, the current position on the screen of a character is detected and the data of the current position and the data of the location from current to before predetermined time are held. For example, the data of the location of a several seconds before is held every [1/] 60 seconds from the present. In addition, management of time amount can be performed using the time data of a timer 16.
[0042] At step 103, the passing speed of a character is computed using the data of the location of the character currently held at step 102. For example, passing speed is computed from the time amount which a travel and migration took using the data of the current position of a character, and the location in front of predetermined time (for example, 1 / 60 seconds before).
[0043] At step 104, the number of after-images displayed behind a character (the migration direction and opposite hand) and the display interval of an after-image are determined corresponding to the speed of the character computed at step 103. For example, the speediness of a character can be emphasized and expressed by making the gap of the adjoining

after-image large, so that the number of after-images displayed, so that the speed of a character is quick is made [many] and it separates from a character. The configuration of an after-image is made into the same configuration as the configuration of a character in this example.

[0044] Drawing 4 and drawing 5 are examples in case a character is a runner, the example of a display of a character when the speed of drawing 4 to the direction of A of a character is slow, and an after-image is shown, and drawing 5 shows the example of a display of a character when the speed to the direction of A of a character is quick, and an after-image. In drawing 4 , the pattern PS 0 of the current position of a character and the patterns RS1-RS5 of five after-images are displayed. Moreover, in drawing 5 , the patterns RF1-RF10 of ten after-images are shown by that speed is quicker than the pattern PF 0 and drawing 4 of the current position of a character.

[0045] In addition, at step 104, only the number of after-images to display and the display interval of an after-image are decided, and it does not specify about the configuration of a character, and the configuration of an after-image.

[0046] Moreover, speediness can be expressed also by the method of making the display interval of an after-image large, so that the number of after-images to display is set constant and speed becomes quick.

[0047] At step 105, the display position of each after-image on a screen is computed using the data of said detected migration direction, the data of the current position, and the number of after-images decided at step 104 and the data of a display interval.

[0048] The transparency of each after-image which should be displayed is determined at step 106. For example, transparency is made high and background drawing decides are more transparent and visible, so that it separates from the current position of a character. Thereby, the speediness of a character can be emphasized more and can be expressed.

[0049] The pattern PS 0 of the current position of a character is opaque, and in the example of drawing 4 , transparency is set up highly, background drawing is more transparent and it appears, so that the patterns RS1-RS5 of five after-images separate from the current position of a character. The example of drawing 5 is the same as that of drawing 4 .

[0050] At step 107, the configuration data of a character, the data of the display position of each after-image determined at step 105, and the data of the transparency of each after-image determined at step 106 are used, and the image data of each after-image on a screen is generated. As shown in the example of drawing 4 and drawing 5 , the configuration of an after-image is made into the same configuration as the configuration of the character of the current position. The image data of one after-image consists of data of three colors of R, G, and B about each dot in an after-image pattern.

[0051] At step 108, the image data of one screen is compounded using the image data of the character of the current position, the image data of each after-image generated at step 107, the image data of the background drawing of a screen, and the image data of other characters on a screen in the condition that the background drawing of each after-image is transparent according to the transparency of each of said after-image.

[0052] At step 109, the image data of one screen compounded at step 108 is supplied to a video generator 18, and the image of a synthetic result is displayed on the screen of a monitor TV 22.

[0053] Drawing 4 shows the image 41 as an example displayed based on the image data of one compounded screen. The pattern PS 0 of the character of the current position is opaque, and it does not appear, but at drawing 4 , by the patterns RS1-RS5 of an after-image, transparency becomes high, the background drawing 42 is more transparent and it appears, so that the background drawing 42 separates from the current position of a character. In addition, the lap portion of after-image patterns is compounding image data so that the pattern of a back after-image may hide. Although the example of drawing 5 is the same as that of drawing 4 , they are the patterns RF1-RF10 of a part with a quick speed of a character, and an after-image. It is displayed mostly.

[0054] In addition, the transparence expression function is given to the video generator 18, and it can also consider as the configuration which compounds the after-image which has transparency with a video generator 18, and other images according to assignment of the transparency from CPU13 to a video generator 18.

[0055] As mentioned above, according to this example, corresponding to the migration direction and speed of a character, two or more after-images of the same configuration as a character are displayed on the display position which determined and determined the display position of an after-image. For this reason, it is not necessary to have the after-image pattern of a different class according to the migration direction and speed of a character, and required data volume can be reduced. Moreover, all the migration directions of a character and the after-image corresponding to speed can be displayed, without increasing data volume.

[0056] Moreover, complicated processing like the method of a general motion blur expression is not needed, but the burden of CPU13 accompanying an after-image expression can be made small.

[0057] Moreover, since the number of after-images to display and the display interval of an after-image are changed according to speed, the speediness of a character can be emphasized and expressed. Moreover, since the transparency of

each after-image is changed according to the distance from the location of a character, the speed of a character can be expressed more effectively.
[0058] In addition, in displaying a character with a polygon model, the three-dimension configuration of a character changes according to change of a view, but in this example, since the after-image is made into the same configuration as the character of the current position, changing the three-dimension configuration of an after-image like a character can be realized easily.
[0059] Drawing 6 shows explanatory drawing at the time of applying the after-image display by translucent display on the occasion of zoom animation. The example of drawing 6 is the case where a globular form character is reduced by the zoom with migration in the direction of C, on the migration locus behind the character pattern PZ0 after migration termination, is translucent and displays the after-image patterns RZ1-RZ4. In addition, the after-image pattern RZ 4 is in the location at the time of migration initiation of a character.
[0060] As a display procedure of an after-image, at the time of migration initiation of a character, the data of the travel to the migration direction, passing speed, and the point ending [migration] is acquired, and the display position of the after-image on a migration locus, the number of after-images, and the transparency of each after-image are determined based on these data, for example.
[0061] After migration of a character is started, it displays one after-image at a time with migration of a character. For this reason, the configuration of a character when a character passes the after-image display point is held for each [which should be displayed] after-image of every, the after-image data of the transparency beforehand decided using the pattern data of this held character is generated, background drawing and the compound image data are generated after this, and it is made to display on a screen.
[0062] Thus, since it is translucent and an after-image can be displayed during migration of a character when a character is reduced or expanded, it cannot be conspicuous and turbulence of the picture in the character by a cutback or amplification of a character can be carried out. Especially at the time of the cutback of a character, it cannot be conspicuous and turbulence of pictures, such as a color jump by thinning out a dot, can be carried out.
[0063] In addition, instead of CD-ROM26, from the cartridge with which the main part 12 of game equipment is equipped, a game program can be read into RAM15 and it can also consider as the configuration which performs a program.
[0064]
[Effect of the Invention] In order to display two or more after-images of the same configuration as a character on the display position which determined and determined the display position of an after-image like **** corresponding to the migration direction and speed of a character according to invention of claim 1, It is not necessary to have the after-image pattern of a different class according to the migration direction and speed of a character. An after-image can be displayed without being able to display all the migration directions of a character, and the after-image corresponding to speed, without being able to reduce required data volume and increasing data volume, and performing complicated processing.
[0065] Moreover, the display position of an after-image is changed according to speed, and since it is translucent and each after-image can be displayed, the sensation of speed of a character can be expressed more effectively than conventional equipment.
[0066] Since the number of after-images displayed according to the speed of a character is changed according to invention of claim 2, the sensation of speed of a character can be emphasized and expressed.
[0067] Since the gap of each after-image displayed according to the speed of a character is changed according to invention of claim 3, the sensation of speed of a character can be emphasized and expressed.
[0068] According to invention of claim 4, since the transparency of each after-image is changed according to the distance from the location of a character, the sensation of speed of a character can be expressed more effectively.
[0069] According to invention of claim 5, when displaying a character with a polygon model, corresponding to a three-dimension configuration changing [a character] according to change of a view, an after-image can also change a three-dimension configuration similarly.
[0070] Since according to invention of claim 6 it is translucent and an after-image can be displayed during migration of a character when a character is reduced or expanded, it cannot be conspicuous and turbulence of the picture in the character by a cutback or amplification of a character can be carried out.

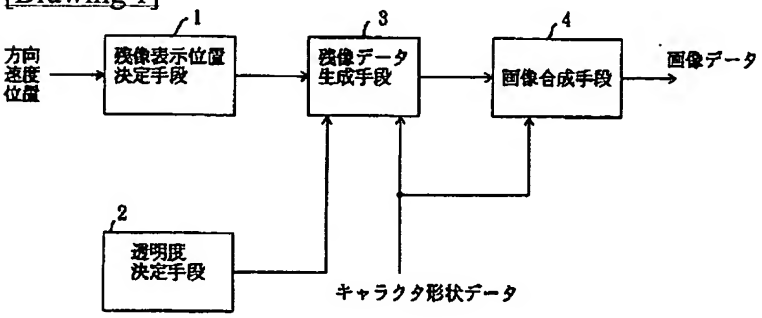
[Translation done.]

* NOTICES *

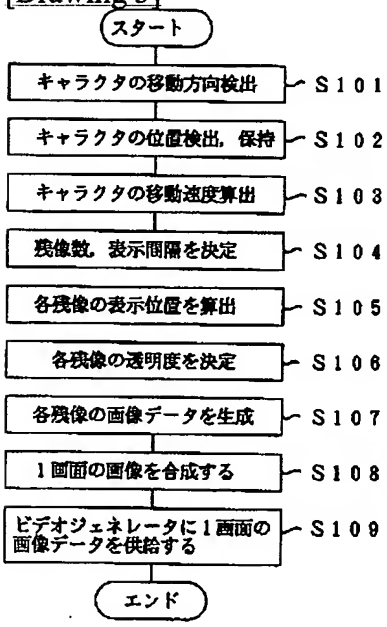
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

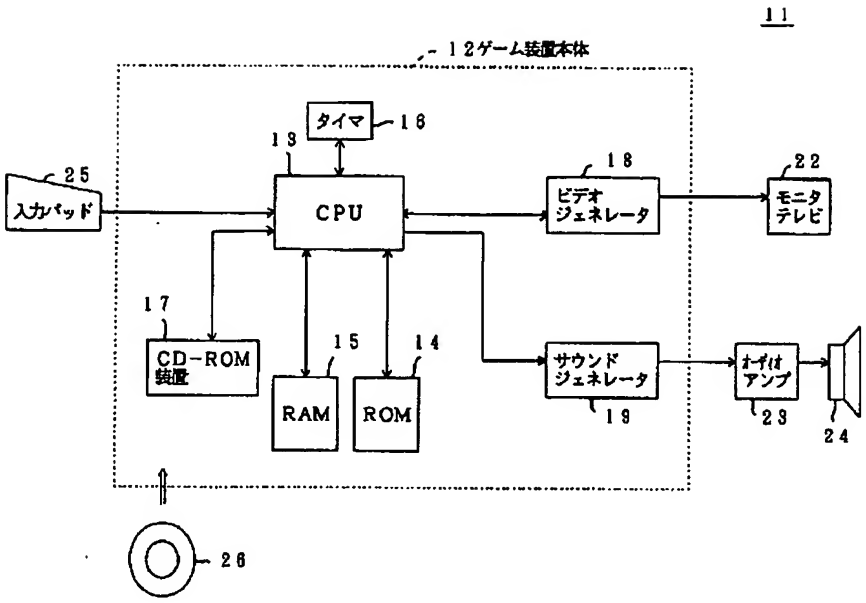
[Drawing 1]



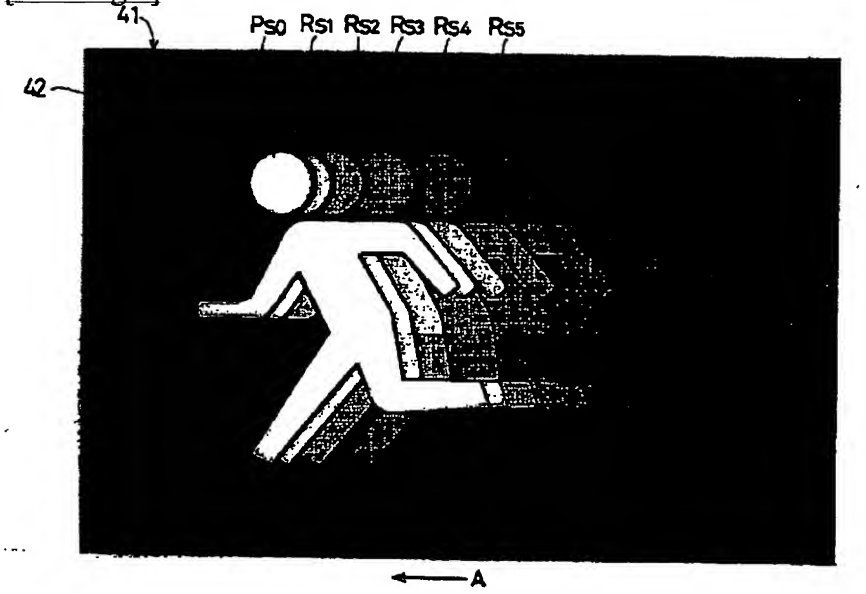
[Drawing 3]



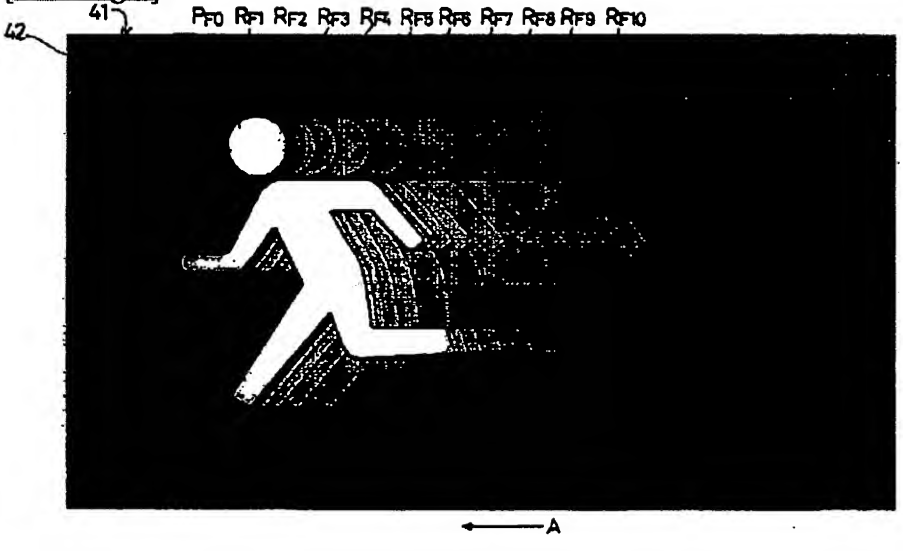
[Drawing 2]



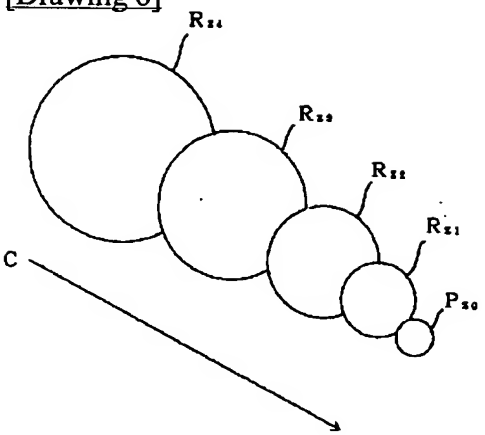
[Drawing 4]



[Drawing 5]



[Drawing 6]



[Translation done.]

* NOTICES *

CORRECTION OR AMENDMENT

[Official Gazette Type] Printing of amendment by the convention of 2 of Article 17 of patent law
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[Procedure amendment]
[Filing Date] June 7, Heisei 13 (2001. 6.7)
[Procedure amendment 1]
[Document to be Amended] Description
[Item(s) to be Amended] Claim
[Method of Amendment] Modification
[Proposed Amendment]
[Claim(s)]
[Claim 1] In game equipment which displays an image on a screen of said display based on image data of one screen which controlled progress of a game according to actuation of a player, or a condition of a game to move a character of a predetermined configuration for a screen top of a display, and was generated according to progress of a game,
An after-image display-position decision means to determine a display position which data of the migration direction of said character, speed, and a location is supplied, is made to correspond to the migration direction and speed of said character, and displays two or more after-images of said character in an opposite hand of the migration direction of said character,
A transparency decision means to determine transparency of each after-image as which a display position was determined by said after-image display-position decision means,
An after-image data generation means to generate image data of each after-image which is the same configuration as said character using configuration data of said character, data of a display position of each of said after-image, and data of transparency of each of said after-image,
Game equipment characterized by having an image composition means to compound image data of one screen in the condition that background drawing of each after-image is transparent according to transparency of each of said after-

image using image data of each of said generated after-image, image data of said character, image data of background drawing of a screen, and image data of other display objects on a screen.
[Claim 2] Said after-image display-position decision means is game equipment according to claim 1 characterized by changing the number of after-images displayed according to speed of said character.
[Claim 3] Said after-image display-position decision means is game equipment according to claim 1 characterized by changing a gap of each after-image displayed according to speed of said character.
[Claim 4] Said transparency decision means is game equipment according to claim 1 characterized by changing transparency of each of said after-image according to distance from a location of a character.
[Claim 5] A configuration of said character is game equipment according to claim 1 characterized by determining a three-dimension configuration with a polygon model according to change of a view.
[Claim 6] It is game equipment according to claim 1 which a configuration of said character is reduced or expanded during migration of said character, and is characterized by said after-image data generation means generating image data of an after-image of magnitude when said character passes through an after-image display position.
[Claim 7] It is the image control method at the time of moving a character currently displayed on the display screen from a current display position to the appointed display position according to actuation of a player, or a condition of a game,
The 1st step which acquires the migration direction of said character, speed, and a location,
The 2nd step which determines a display position which displays two or more after-images of said character on an opposite hand of the migration direction of said character according to the migration direction and speed of said character,
The 3rd step which determines transparency of each of said after-image,
An image control method characterized by having the 4th step which displays said character and said after-image on the display screen.
[Claim 8] An image control method according to claim 7 characterized by thing of a number which displays said after-image, and a gap to display for which either is changed at least according to passing speed of said character.
[Claim 9] An image control method according to claim 7 or 8 characterized by changing transparency of said after-image according to distance from said character.
[Claim 10] Said character and after-image are the image control method given in claim 7 characterized by determining a three-dimensions configuration according to change of a view thru/or any 1 term of 9.
[Claim 11] It is an image control unit given in claim 7 characterized by displaying an after-image of magnitude when a configuration of said character is reduced or expanded during migration of a character and, as for said after-image, said character passes through said after-image display position thru/or any 1 term of 10.
[Claim 12] An image generation method given in claim 7 characterized by holding a configuration of said character when said character passes through said after-image location, and generating said after-image using the configuration data thru/or any 1 term of 11.
[Claim 13] <U> Said after-image is the image-processing method given in claim 7 characterized by being the same configuration as said character thru/or any 1 term of 11.
[Procedure amendment 2]
[Document to be Amended] Description
[Item(s) to be Amended] 0021
[Method of Amendment] Modification
[Proposed Amendment]
[0021] In invention of claim 6, the configuration of said character is reduced or expanded during migration of said character, and said after-image data generation means 3 generates the image data of the after-image of magnitude when said character passes through an after-image display position. Invention of claim 7 is the image control method at the time of moving the character currently displayed on the display screen from a current display position to the appointed display position according to actuation of a player, or the condition of a game. The 1st step which acquires the migration direction of said character, speed, and a location, The 2nd step which determines the display position which displays two or more after-images of said character on the opposite hand of the migration direction of said character according to the migration direction and speed of said character, It is the image control method characterized by having the 3rd step which determines the transparency of each of said after-image, and the 4th step which displays said character and said after-image on the display screen. Invention of claim 8 is the image control method characterized by the thing of the number which displays said after-image, and the gap to display for which either is changed at least according to the passing speed of said character. Invention of claim 9 is the image control method characterized by changing the

transparency of said after-image according to the distance from said character. Invention of claim 10 is the image control method characterized by determining a three-dimensions configuration according to change of a view, as for said character and after-image. When, as for invention of claim 11, the configuration of said character is reduced or expanded during migration of a character, said after-image is an image control unit characterized by displaying the after-image of magnitude when said character passes through said after-image display position. Invention of claim 12 is an image generation method characterized by holding the configuration of said character when said character passes through said after-image location, and generating said after-image using the configuration data. Invention of claim 13 is the image-processing method characterized by said after-image being the same configuration as said character.
[Procedure amendment 3]
[Document to be Amended] Description
[Item(s) to be Amended] 0028
[Method of Amendment] Modification
[Proposed Amendment]
[0028] In invention of claim 6, since it is translucent and an after-image can be displayed during migration of a character when a character is reduced or expanded, it makes it possible not to be conspicuous and to carry out turbulence of the picture in the character by a cutback or amplification of a character. Moreover, in invention of claim 7, a display position is changed according to speed, and the effective after-image expression according to transparency is enabled. Moreover, also in invention of claim 8 thru/or claim 13, an effective after-image image is generated like invention of claim 2 thru/or claim 6.
[Procedure amendment 4]
[Document to be Amended] Description
[Item(s) to be Amended] 0070
[Method of Amendment] Modification
[Proposed Amendment]
[0070] Since according to invention of claim 6 it is translucent and an after-image can be displayed during migration of a character when a character is reduced or expanded, it cannot be conspicuous and turbulence of the picture in the character by a cutback or amplification of a character can be carried out. Moreover, in invention of claim 7, a display position is changed according to speed, and the effective after-image expression according to transparency is enabled. Moreover, also in invention of claim 8 thru/or claim 13, it becomes possible to generate an effective after-image image like invention of claim 2 thru/or claim 6.

[Translation done.]